U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Office of Public Works and Intermodal
Public Works and Water Resources Division

SCIENTIFIC INVESTIGATIONS MAP 2861
Carnahan Bayou Aquifer--Sheet 2 of 2
Brantly, J.A., and Seanor, R.C., 2005, Louisiana Ground-Water Map No. 18:
Potentiometric Surface, 2003, Jasper Aquifer System in West-Central Louisiana

Carnahan Bayou Aquifer

The generalized potentiometric surface of the Carnahan Bayou aquifer was constructed using water levels from 29 wells completed in the aquifer (table 2). Measured water levels ranged from 308.82 ft above NGVD 29 in well V-291, in the outcrop area of northern Vernon Parish, to 231.85 ft below NGVD 29 in well R-616, in the Alexandria-Pineville area in northeastern Rapides Parish. Water levels are lowest in the areas affected by major pumping centers, including the Alexandria-Pineville area and the Kisatchie well-field area in Rapides Parish. Flow lines show movement of ground water is generally toward the major pumping centers (fig. 4). In general, water-level gradients are steeper in and near outcrop areas and major pumping centers. Water-level gradients are less steep in the areas downdip of the outcrop areas and areas minimally affected by pumpage. Water-level gradients (2003) vary from approximately 5 ft/mi in southern Vernon Parish to approximately 40 ft/mi or more in the outcrop area of northern Rapides Parish (fig. 4).

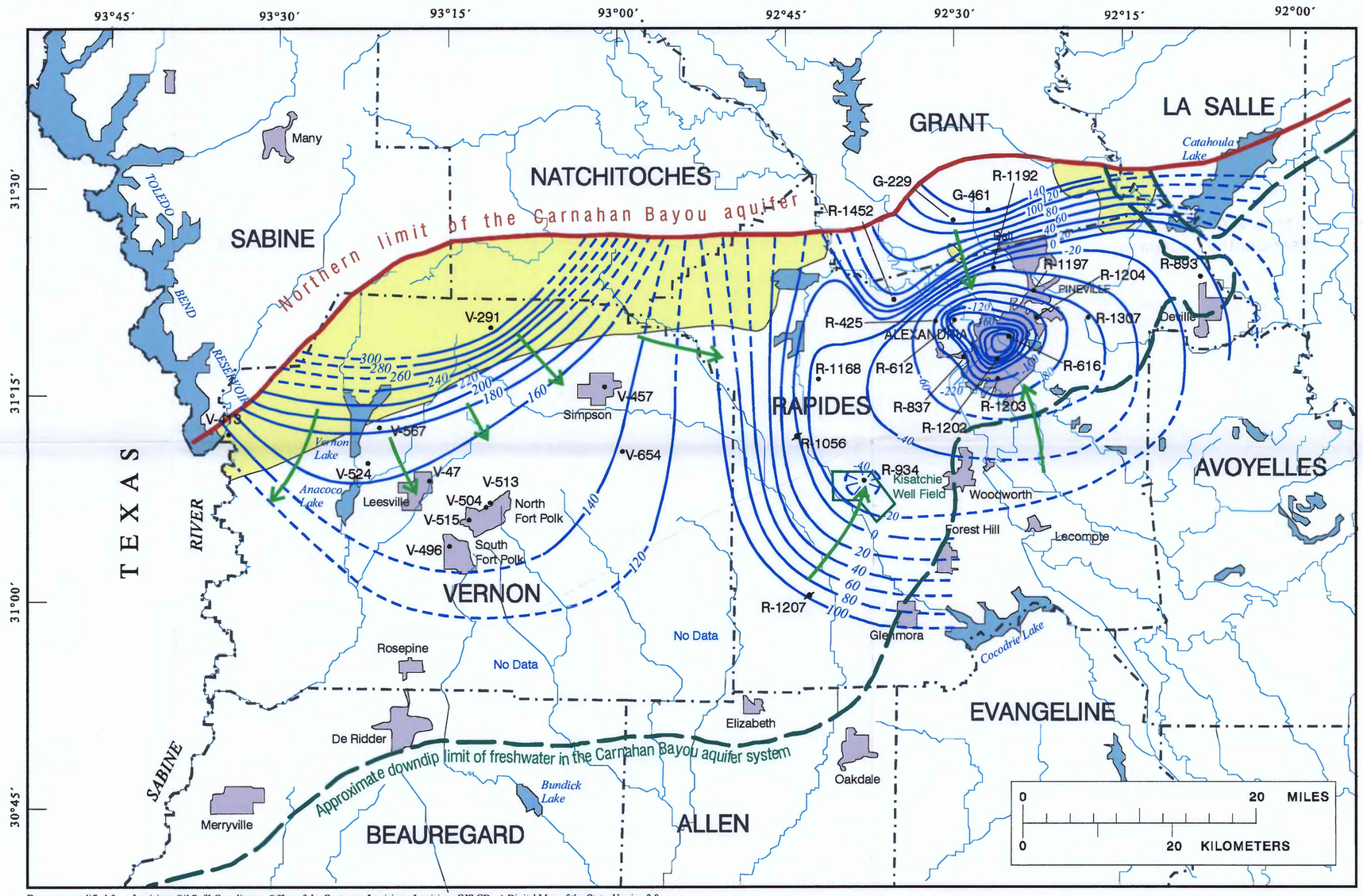
Cones of depression in the Carnahan Bayou aquifer are located near the major pumping centers--the Alexandria-Pineville area and the Kisatchie well-field area. Pumpage, mainly for public supply and industrial purposes (B.P. Sargent, U.S. Geological Survey, written commun., 2003) has created cones of depression.

Hydrographs of two wells in western Rapides Parish are shown in figure 5. The hydrograph of well R-1207 shows water levels decreased about 1.4 ft/yr during the period from 1982 to 1999. Since 1999, water levels in well R-1207 have fluctuated less than 1 ft annually and have been stable. Water levels in well R-1056 decreased approximately 5.4 ft/yr from 1978 to 1990. During the period from 1990 to 1998 water levels declined about 0.9 ft/yr. No declines have been detected since 1998.

Table 2. Water-level data used to construct the potentiometric-surface map of the Carnahan Bayou aquifer, west-central Louisiana, March-April 2003.

[NGVD 29, National Geodetic Vertical Datum of 1929]

Well number	Well depth, in feet below land surface	Water level, in feet above or below (-) land surface	Water level, in feet above or below (-) NGVD 29	Date measured
Grant Parish				
G-229	250	1.20	131.20	3-20
G-461	190	-54.76	145.24	4-08
Rapides Parish				
R-425	462	-158.07	-77.47	4-09
R-612	577	-231.95	-151.95	4-09
R-616	1,078	-331.85	-231.85	4-28
R-837	1,025	-166.35	-86.35	4-09
R-893	820	-70.05	-10.05	3-27
R-934	1,350	-276.23	-53.23	4-23
R-1056	1,555	-236.11	3.89	4-08
R-1168	1,081	-198.69	-33.69	3-25
R-1192	314	-167.38	-37.38	4-03
R-1197	750	-175.06	-55.06	3-27
R-1202	1,190	-282.97	-202.97	4-09
R-1203	990	-179.49	-104.49	4-09
R-1204	640	-214.69	-104.69	4-28
R-1207	2,772	-80.51	99.49	4-08
R-1307	803	-201.93	-61.93	4-08
R-1452	420	-28.96	56.04	4-28
Vernon Parish				
V-47	683	-87.68	152.32	3-18
V-291	181	-29.18	308.82	3-11
V-413	360	18.95	138.95	3-18
V-457	930	-155.03	144.97	3-24
V-496	1,415	-133.93	150.27	4-02
V-504	1,288	-192.14	142.86	4-01
V-513	1,275	-188.06	146.94	4-01
V-515	1,233	-173.46	146.54	4-01
V-524	435	-90.22	169.78	4-22
V-567	620	-86.46	183.54	3-10
V-654	1,574	-142.17	137.83	3-19



Base map modified from Louisiana Oil Spill Coordinator, Office of the Governor, Louisiana, Louisiana GIS CD: A Digital Map of the State, Version 2.0

EXPLANATION

- GENERALIZED OUTCROP AREA AND PRINCIPAL AREA OF RECHARGE FOR THE CARNAHAN BAYOU AQUIFER (Modified from Martin and others, 1988)
- 140 — POTENTIOMETRIC CONTOUR--Shows altitude at which water level would have stood in tightly cased wells. Dashed where approximately located. Contour interval is 20 feet. Datum is NGVD 29
- FLOW LINE INDICATING GENERAL DIRECTION OF GROUND-WATER FLOW
- V-654 — CONTROL POINT AND WELL NUMBER
- R-1056 — OBSERVATION WELL FOR WHICH HYDROGRAPH IS SHOWN

Figure 4. Potentiometric surface of the Carnahan Bayou aquifer in west-central Louisiana, March-April 2003.

SELECTED REFERENCES

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CONVERSION FACTORS AND DATUMS

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
foot per year (ft/yr)	0.3048	meter per year (m/yr)
mile (mi)	1.609	kilometer (km)
foot per mile (ft/mi)	0.1894	meter per kilometer (m/km)
million gallons per day (Mgal/d)	3,785	cubic meter per day (m^3/d)

Vertical coordinate information in this report is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada.
Horizontal coordinate information in this report is referenced to the North American Datum of 1927.

Louisiana Ground-Water Map No. 18:

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By

Jeffrey A. Brantly and Ronald C. Seanor

2005

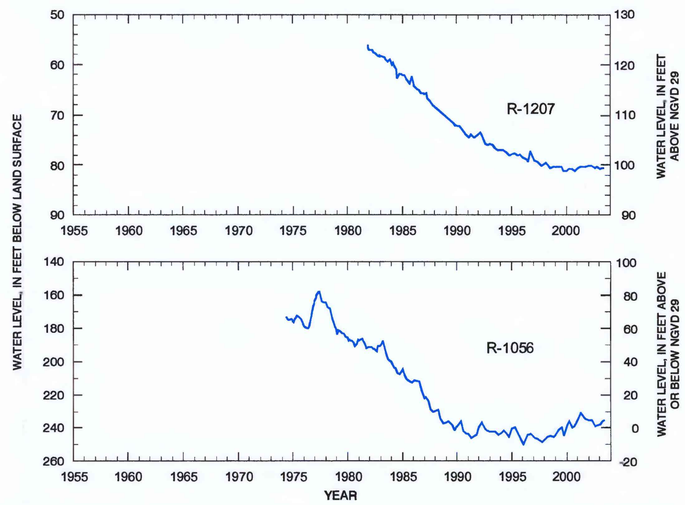

Figure 5. Water levels in wells R-1207 and R-1056 in the Carnahan Bayou aquifer, Jasper aquifer system in west-central Louisiana.